EXPERIMENTAL STUDIES OF THE LIQUID-GLASS TRANSITION
Herman Z. Cummins - City College - CUNY: **DMR-0243471**

In liquids composed of anisotropic molecules, translational and orientational dynamics interact through the rotation - translation (RT) coupling effect. This RT coupling affects the flow properties of such liquids during material processing and transport.

In the late 1960's, laser light-scattering studies of such liquids with the polarizations of the incident and scattered light orthogonal, revealed a previously unknown feature - a narrow dip centered at $\omega = 0$ which is designated as the "Rytov dip" seen in the VH light-scattering spectrum of the molecular glassforming liquid Salol in figure 1.

We have carried out an extensive light-scattering study of Salol and observed another RT coupling effect recently predicted in two theoretical papers: a region of negative intensity at low frequencies in the scattering-angle-dependent part of the polarized spectrum (polarizations of the incident and scattered light parallel - the VV scattering geometry). In Figure 2, we show a set of such spectra for Salol, with two sets of fits. Those that ignore RT coupling (as has always been done in the past) are shown as broken lines; those that include RT coupling are shown as solid lines. The fits were made to the published theoretical predictions.

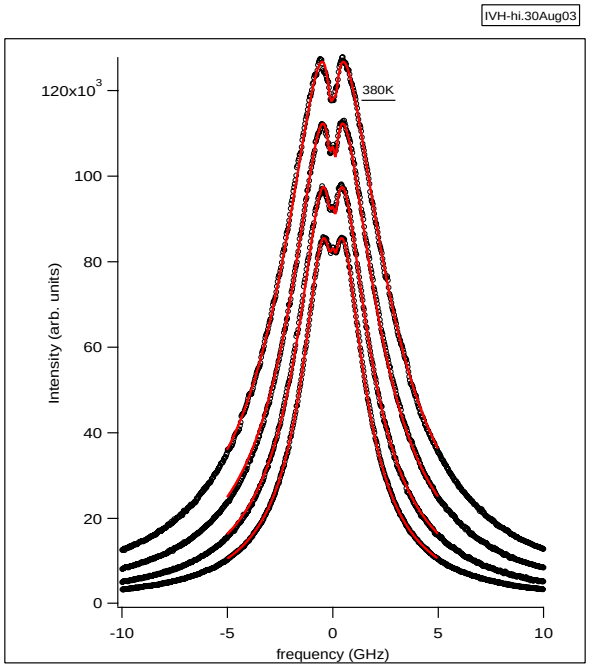

FIG. 1. I^{90}_{VH} spectra at T = 380, 370, 360, and 350 K.

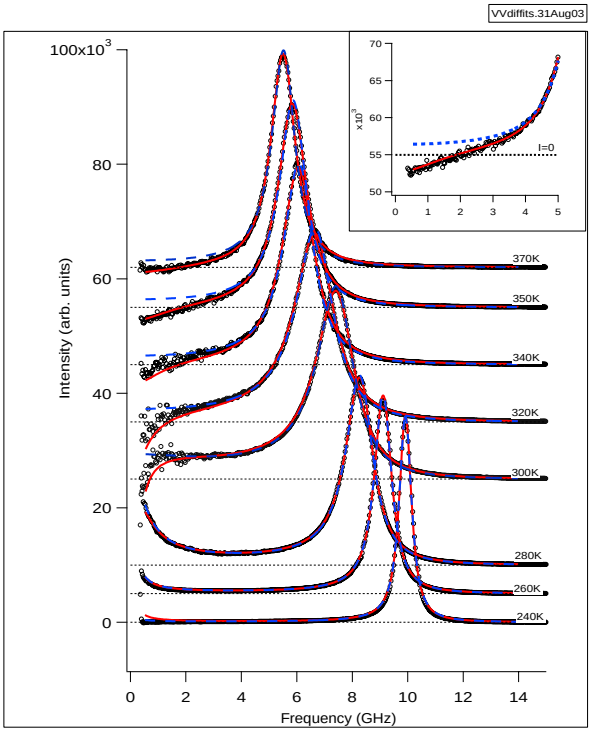

FIG. 2. VV Difference spectra for T =240, 260, 280, 300, 320, 340, 350, and 370K.